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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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COUNTRY	USSR (Kuybyshev and Kalinin Oblasts)	REPORT	
SUBJECT	1. Aircraft Engine Design at Kuybyshev	DATE DISTR.	1 March 1954
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PART II - REPORT - KUYBYSHEV ACTIVITY, USSR

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012 Engine

Many parts for this engine were brought from Germany and certain parts were made in Russia. The first test run was in 1949 and by 1953, 25 engines had been made and a satisfactory run of 100 hours completed. In May 1951, three engines were sent away to an unknown destination.

022 Engine

Towards the end of 1951, drawings had been completed for a coupled 022 (see drawing attached). The weight of the gear-box was approximately one ton (German). Two contra rotating three-bladed propellors were used. Diameter of revolution was $3\frac{1}{2}$ m.

approximately 15 complete coupled units (30 engines) were produced of which 4 units were sent away to an unknown destination. in November/December 1952 the first bench test of this coupled engine took place and during the test the gear-box broke.

The sixth unit produced some time in 1953 is alleged to have been air tested. when this engine was returned to KUYBYSHEV for a strip examination, the external condition of the unit was such that everybody assumed it had been damaged during installation or withdrawal from an aircraft. Although other likely explanations for the engine's condition could be offered rumour was rife at KUYBYSHEV to the effect that this coupled had been on air test.

'K' Type Engines (see drawings attached)

An engine described as the 'K' Type being a turbo prop (one prop, not sure 2 or 4 blades) axial flow 12 stage compressor with a 4-stage turbine, is alleged to have been produced at KUYBYSHEV. Approximately 5-9 engines were made but K1, K2, K3, K4, K5, K6, K7, K8 and K9 as modifications to a basic type. These modifications appear to consist only of repositioning of external components and pipe runs. Total length of this engine from prop boss to end of tail pipe 5.7 m.

The 12-stage compressor is so designed that the angle of the stator blades can be altered during operation and 12 flaps can open externally around the compressor casing. These flaps are rectangular in shape and measure approximately 8 x 20 cm. Each flap covers approximately two stages and for this purpose, the positioning of the flaps are staggered around the circumference. these flaps are actuated by oil pressure and automatically whilst the engine is in operation.

Note:

Possibly these flaps are introduced to obviate surging. Also, judging by the overall length of the engine, its total power output must be in the region of 5000 hp, and in our opinion, this engine should be equipped with counter rotating propellors

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Ceramic Blocks used to reduce Turbine Blade Tip Clearances

of blade tip clearance had seriously worried the authorities at KUYBYSHEV. One method used to reduce clearance was the introduction of graphite blocks adjacent to the stator blade retaining ring. This proved unsuccessful.

In January/February 1953, Department 17 at KUYBYSHEV under Dr. LORENZ produced a block, red in colour, not porous, matt finished, similar to the material used in a matt-finished red tile. These blocks were the same shape and dimensions as the graphite blocks Tests with these blocks proved extremely successful and either the 012 or the 022 did a test run successfully of 100 hours with these blocks installed. The decision was then made to instal these blocks in the 012, the 022 and in the 'K' series type engine.

Activities on Island

Most of the technicians were employed in the workshop which operates in two shifts making high pressure valves of various sizes (about 100 of these were made). The drawings for these valves were marked with a black triangle. (this is a characteristic of drawings emanating from Inst. 88, and these fittings were required for standard rocket test rigs).

In addition to the pressure fittings, the workshop over the period in question also turned out about 3 "oscillographs" and 3 metal mirrors, 4 - 5 m. diameter which were connected with Radar work. These mirrors were adjustable in elevation only

frequent noises from a test stand on which combustion experiments were stated to be taking place.

an aircraft flying over the island which was said to carry out flights connected with ground radar mirrors. No further details are known.

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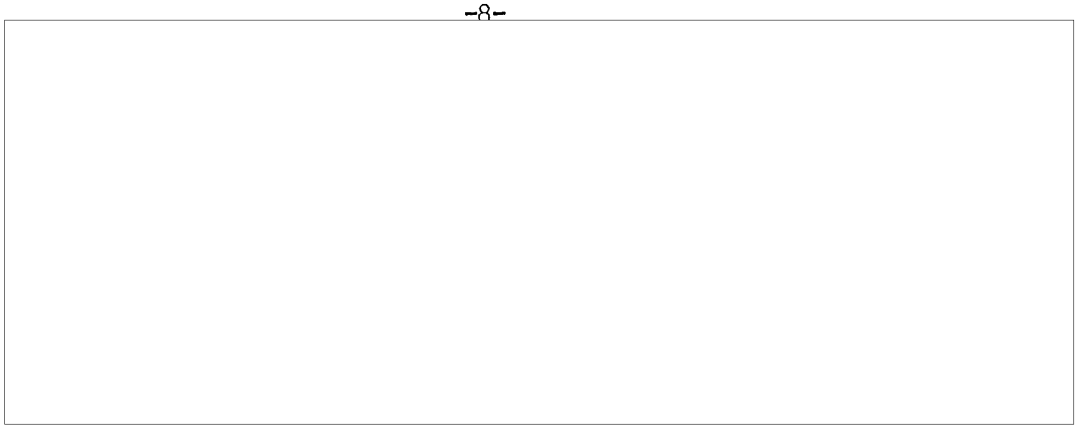

PART IV - ANNEXES

Annexe 'AA - Sketch of Coupled 022 engines, slowing gear box, front view.

" 'B' - Sketch of K Type series engine.

" 'C' - Sketch showing Coupled 022 engine (side view).

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Annex 'A'

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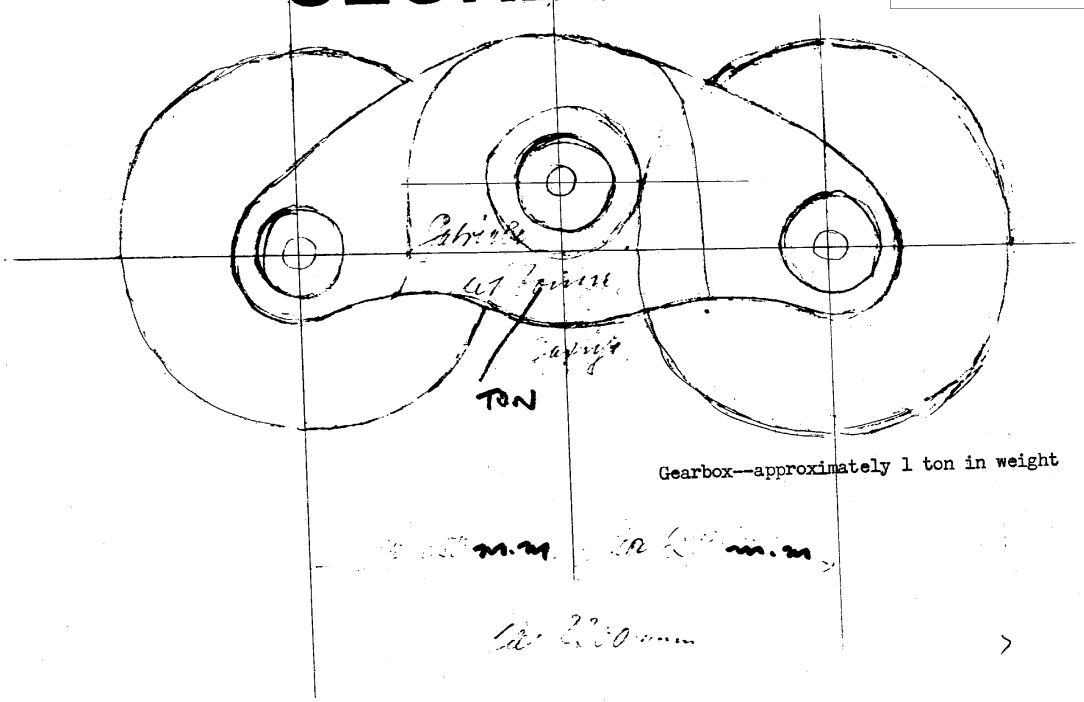

Gearbox--approximately 1 ton in weight

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SKETCH OF COUPLED 022 ENGINES SHOWING GEARBOX FRONT VIEW

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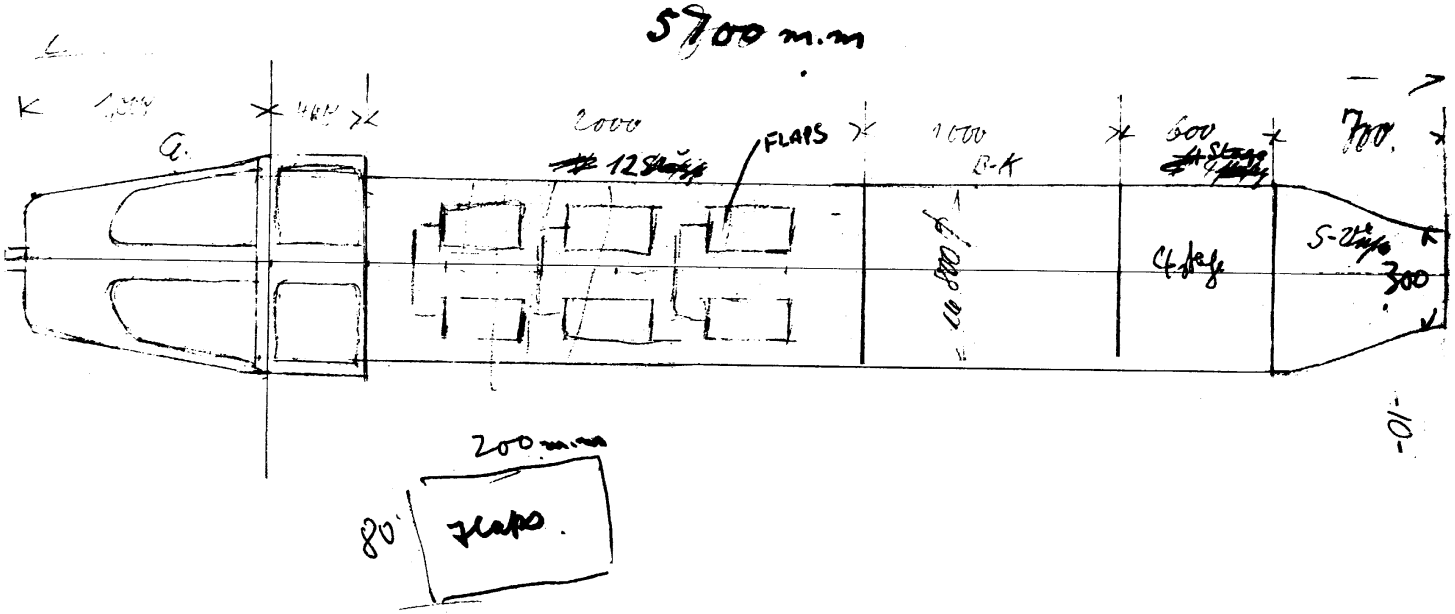
Annex "B"



-10-

SKETCH OF 'K' TYPE SERIES ENGINE

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SIDE VIEW OF COUPLED 022 ENGINE

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Annex "C"

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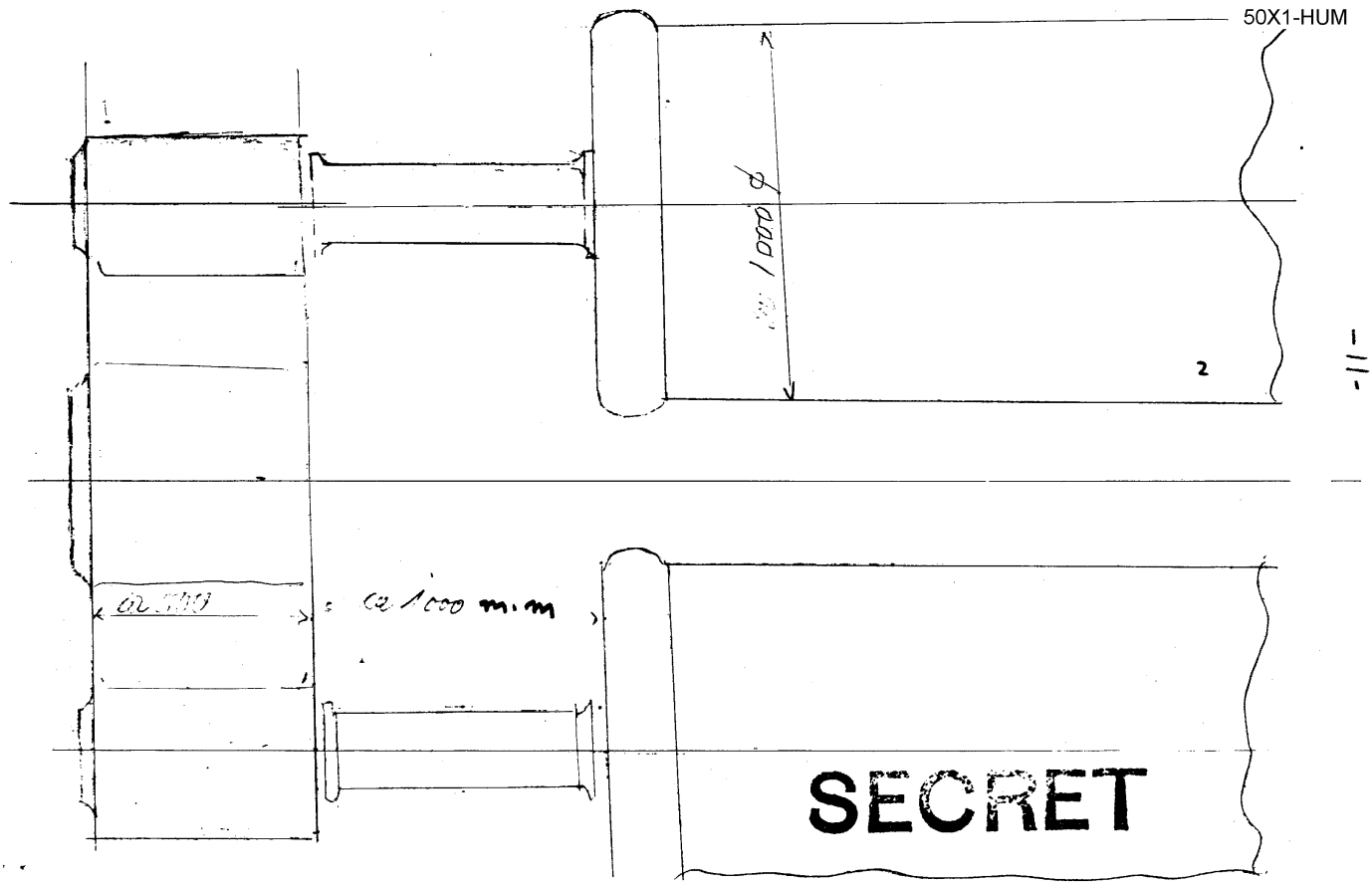

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